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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SONG, MATTHEW J

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,719	Applicant(s) SASURA ET AL.	
	Examiner MATTHEW J. SONG	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5-9,11,12 and 15-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-9,11,12 and 15-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1, 5, 6, 15, 17, 18, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Schmid (US 3,898,051).

Schmid discloses an apparatus for producing crystals wherein a seed crystal is placed in a crucible retained in a furnace, raw materials are filled in the crucible and heated and liquified and a crystal is grown by slow cooling from below (See Fig 3a-3d and col 7, ln 15-68). Schmid also teaches a temperature controlling means including a hollow constructed cap (inlet tube **40** and outlet tube **42**) mounted directly outside a portion of the crucible where the seed crystal is placed, the cap being spaced from a crucible support member **50** (col 2, ln 1-68 and Fig 1). Schmid also discloses a temperature controller **85** is responsive to temperatures sensed by a thermocouple to vary the flow of a helium source as required (col 3, ln 55 to col 4, ln 2), which reads on a means for regulating refrigerant flow. Schmid discloses the helium flow controls the temperature adjacent the crucible bottom portion to be below the melting point of the seed crystal (col 5, ln 5-30), which reads on the temperature controlling means performs cooling in the vicinity of the seed crystal locally.

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Referring to claims 5 and 22, Schmid teaches a heating element **26** and a heat source **86**, which would heat the heat exchanger **32** (col 4, ln 40-50 and col 2, ln 20-40), which reads on the cap includes a heater, and the controller **85** controls the heating source and the refrigerant flow (col 3, ln 55 to col 4, ln 5).

In regards to claim 6, Schmid teaches a helium cooled tungsten/molybdenum heat exchanger (col 2, ln 20-40), which is interpreted to read on a metal having conductive property, heat resistant and corrosion resistant of an equivalent.

Referring to claim 15, Schmid teaches the flow of refrigerant through the inlet tube **40** and the outlet tube **42**, where the cross section of the inlet and outlet tubes are different, which reads on a cross section of the pipe varies in size along the path direction of the refrigerant flow.

Referring to claim 17, Schmid teaches a crucible configured to receive a seed **100** and raw materials, the crucible having a lower portion in which the seed is placed (Fig 3a and col 5, ln 1-67); a heating element **26** configured to heat and liquefy the raw materials (col 4, ln 1-67); a crucible support **38, 50** on which the crucible rests (col 4, ln 1-30 and Fig 1). Schmid discloses the helium flow controls the temperature adjacent the crucible bottom portion to be below the melting point of the seed crystal (col 5, ln 5-30), which reads on the temperature controlling means performs cooling in the vicinity of the seed crystal locally. Schmid also teaches a temperature controlling means including a hollow constructed cap (inlet tube **40** and outlet tube **42**) mounted directly outside a portion of the crucible where the seed crystal is placed, the cap being spaced from a crucible support member **50** (col 2, ln 1-68 and Fig 1), which reads on a refrigerant flow being separated from the crucible support member. Schmid also discloses a temperature controller **85** is responsive to temperatures sensed by a thermocouple to vary the

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flow of a helium source as required (col 3, ln 55 to col 4, ln 2), which reads on a means for regulating refrigerant flow.

Referring to claim 18, Schmid teaches a hollow cap (see remarks above regarding claim 1).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 3 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmid (US 3,898,051) as applied to claims 1, 5, 6, 15, 17, 18, and 22 above.

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Schmid teaches all of the limitations of claims 3 and 19, as discussed previously, except the cap is divided into multiple caps and a temperature controlling means for independently regulating flow to each hollow portion.

Schmid teaches a single cooling tube and a temperature regulating means for controlling flow to the cooling tube (Col 2, ln 20-40 and col 3, ln 55 to col 4, ln 5). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Schmid by duplication of part to provide a cap with a plurality of cooling tubes with flow regulating means because duplication of parts is prima facie obvious (MPEP 2144.04).

5. Claims 7-9, 11-12 and 16, 20, 21, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmid (US 3,898,051) as applied to claims 1, 5, 6, 15, 17, 18, and 22 above, and further in view of Von Ammon et al (US 5,567,399) and Hemley et al (US 2003/0084839).

Schmid et al teaches all of the limitations of claims 7 and 20, as discussed previously, except a helical pipe.

In an apparatus for crystallization, Von Ammon et al teaches a duct system comprising at least one annular or spirally or meandrously coiled cooling tube through which a liquid coolant flows to cool a growing crystal (col 1, ln 55 to col 2, ln 30).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Schmid by using a spirally coiled cooling tube, as taught by Von Ammon et al, because a helically shaped coolant path is known in the art to provide a more efficient cooling, as evidenced by Hemley et al (para [0033]).

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Referring to claims 8 and 21, the combination of Schmid, Von Ammon et al and Hemley et al teaches an inlet below an outlet ('399 Fig 1 where outlet 11 above inlet 10 and '051 Fig 1 where inlet at bottom and discharge at top of tube 40).

Referring to claim 9, the combination of Schmid, Von Ammon et al and Hemley et al teaches at least one cooling tube, which clearly suggests multiple pipes. Furthermore, Schmid teaches a single cooling tube and a temperature regulating means for controlling flow to the cooling tube (Col 2, ln 20-40 and col 3, ln 55 to col 4, ln 5). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Schmid, Von Ammon et al and Hemley et al by duplication of parts to provide a cap with a plurality of cooling tubes with flow regulating means because duplication of parts is prima facie obvious (MPEP 2144.04).

Referring to claim 11-12, see remarks above regarding claims 5-6

Referring to claim 16 and 23, Schmid teaches the flow of refrigerant through the inlet tube **40** and the outlet tube **42**, where the cross section of the inlet and outlet tubes are different, which reads on a cross section of the pipe varies in size along the path direction of the refrigerant flow. Furthermore, It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Schmid, Von Ammon et al and Hemley et al to vary the cross section of the cap along the flow direction because changes in size are prima facie obvious (MPEP 2144.04).

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6. Claims 7-9, 11-12 and 16, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmid (US 3,898,051) as applied to claims 1, 5, 6, 15, 17, 18, and 22 above, and further in view of Doguchi (US 2004/0261691).

Schmid et al teaches all of the limitations of claim 7, as discussed previously, except a helical pipe.

In an apparatus for crystallization, Doguchi teaches a cooling component **130** is a metallic double pipe rolled like a spiral and covered with a carbon case to prevent corrosion.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Schmid by using a spirally coiled cooling tube with a carbon cover, as taught by Doguchi, to form a uniform cooling plane ([0037]).

Referring to claim 8, the combination of Schmid and Doguchi teaches an inlet below an outlet ('051 Fig 1 where inlet at bottom and discharge at top of tube 40).

Referring to claim 9, the combination of Schmid and Doguchi teaches a single cooling tube and a temperature regulating means for controlling flow to the cooling tube (Col 2, ln 20-40 and col 3, ln 55 to col 4, ln 5). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Schmid and Doguchi by duplication of parts to provide a cap with a plurality of cooling tubes with flow regulating means because duplication of parts is prima facie obvious (MPEP 2144.04).

Referring to claim 11-12, see remarks above regarding claims 5-6

Referring to claim 16 and 23, Schmid teaches the flow of refrigerant through the inlet tube **40** and the outlet tube **42**, where the cross section of the inlet and outlet tubes are different, which reads on a cross section of the pipe varies in size along the path direction of the refrigerant

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flow. Furthermore, It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Schmid and Doguchi to vary the cross section of the cap along the flow direction because changes in size are prima facie obvious (MPEP 2144.04).

Response to Arguments

7. Applicant's arguments with respect to claims 1, 3, 5-9, 11-12 and 15-23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. SONG whose telephone number is (571)272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on 571-272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song
Examiner
Art Unit 1792

MJS

March 27, 2010

/Robert M Kunemund/
Primary Examiner, Art Unit 1792